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July 5, 2005

Mr. Norman Shopay
California Department of Toxic Substances Control
Geology and Corrective Action Branch
700 Heinz Avenue
Berkeley, California 94710

Ms. Cathy Wolff-White
U.S. Bureau of Land Management
2610 Sweetwater Avenue
Lake Havasu, AZ 86406

Subject: Interim Measure No. 3 Closure Planning – Baseline Soil Sampling Work Plan,
Pacific Gas and Electric Company, Topock Project

Dear Mr. Shopay and Ms. Wolff-White:

This letter transmits a work plan for collection of soil samples from the vicinity of the Interim Measures No. 3 facilities (pipelines and treatment plant). The purpose of the sampling is to assess concentrations in soil in the vicinity of the pipelines and treatment plan prior to IM No. 3 startup. The work plan provides the proposed sampling locations and depths, analytical parameters, sampling methodologies, data validation and management procedures, planned reporting and permitting activities, and a proposed schedule.

If you have any questions, please do not hesitate to contact me. I can be reached at (805) 546-5243.

Sincerely,

Cc: Kate Burger/DTSC
Sally Murray/BLM
Mark Howell/BLM

Interim Measures No. 3 Closure Planning - Baseline Soil Sampling Work Plan

PREPARED FOR: Pacific Gas & Electric
PREPARED BY: CH2M HILL
DATE: July 5, 2005

Introduction

Pacific Gas and Electric Company (PG&E) is addressing chromium in groundwater at the Topock Compressor Station located in Needles, California under the Resource Recovery and Conservation Act (RCRA) corrective action program. PG&E is performing these activities under the oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). On July 8, 2004, PG&E submitted the *Summary of Proposed Project for Interim Measures No. 3* to manage increased volumes of extracted groundwater, in compliance with DTSC directives (CH2M HILL 2004). In a letter dated June 30, 2004, DTSC approved with conditions the *Summary of Proposed Project for Interim Measures No. 3* (DTSC 2004). The goal of Interim Measure No. 3 is hydraulic control of the plume boundaries near the Colorado River to maintain a landward gradient. The Interim Measure No. 3 system consists of a treatment facility, piping to carry untreated groundwater from the extraction wells to the treatment facility, and piping to carry treated water from the treatment facility to injection wells for re-injection.

As part of PG&E's planning for the ultimate closure and restoration of the areas used for interim measures to conditions consistent with those existing on the property prior to facility operation, this work plan has been developed to provide a scope of work and schedule to collect soil samples from the vicinity of the Interim Measure No. 3 system to assess background concentrations of metals and inorganic compounds prior to startup and operation of the system.

Objectives

The primary objective of the Interim Measure No. 3 soil sampling program is to determine naturally-occurring background concentrations of metals, including hexavalent chromium [Cr(VI)] and total chromium [Cr(T)], and other inorganic compounds in soil in the direct vicinity of the IM3 system prior to startup and operation. As part of future Interim Measures No. 3 closure activities or in the event of a release of wastewater and/or treatment chemicals from the treatment system or pipelines during operation that necessitates some cleanup prior to closure, such baseline data would be used to assess impacts associated with the release, assess the appropriate level of site restoration, and guide remediation (if necessary).

Project Background

For the purposes of this Work Plan, the Interim Measure No. 3 system can be divided into three primary components based on location and the types of materials handled in each area. The three primary components consist of:

- 1) MW20 Bench to Treatment Plant Pipelines (collectively referred to as “influent pipelines”);
- 2) Treatment Facility; and
- 3) Effluent Pipeline.

Locations of these three components are shown on Figure 1. Each of these components is described separately below.

MW20 Bench to Treatment Plant

Three separate pipelines run in a single alignment between the MW20 Bench and the treatment facility:

- 1) Influent Pipeline: carries untreated groundwater from the extraction well (TW2D) to the treatment facility;
- 2) Effluent Pipeline to MW-20 Bench: conveys treated water from the treatment facility to the MW20 bench for offsite disposal, in the event that effluent is not being conveyed to injection wells for disposal;
- 3) RO Concentrate Pipeline: conveys reverse osmosis (RO) concentrate from the treatment plant to the MW20 bench (for offsite disposal).

Interim Measures No. 3 currently utilizes a single extraction well located at the MW20 bench adjacent to Park Moabi Road and just north of the railroad line (see Figure 1). From the MW-20 bench, the pipelines run first along Park Moabi Road and then along an unpaved access road to the treatment facility located on the west side of Bat Cave Wash. The influent pipeline is constructed of double-contained high-density polyethylene (HDPE) pipe, the effluent pipeline is a 4-inch aluminum pipe, and the RO Concentrate pipeline is a 3-inch pipe. All three pipelines are buried approximately 3 feet below grade.

The influent pipeline will carry untreated groundwater. The effluent pipeline will carry treated groundwater from the treatment plant back to the MW20 bench for offsite disposal, in the event that effluent is not conveyed to the injection wells for disposal. The RO Concentrate pipeline will convey RO Concentrate from the treatment plant to the MW20 bench for offsite disposal. Representative concentrations of constituents found in influent, effluent, and RO Concentrate are summarized in Table 1. In general, untreated groundwater contains metals including Cr(VI) and Cr(T). In addition, naturally-occurring total dissolved solids (TDS), composed primarily of sodium chloride, are also relatively high. Following treatment, the effluent contains Cr(VI) and Cr(T) concentrations that are orders of magnitude lower than the untreated water and below Maximum Contaminant Levels (MCLs) for drinking water. RO Concentrate has elevated TDS and chloride. The TDS of this concentrate will be approximately the same as seawater. Based on these data, analytes for

background soil sampling in the vicinity of the influent pipelines will consist of metals including Cr(VI) and Cr(T), sodium, chloride, and electrical conductivity (EC).

Treatment Facility

The treatment facility is located just west of Bat Cave Wash (Figure 1). Extracted groundwater will be treated at this facility to remove chromium (through reduction and precipitation) and lower TDS (using reverse osmosis). Treatment facilities include process equipment such as storage tanks (influent, effluent, and chemical), pumps, piping, reactors, and instrumentation installed on a concrete slab foundation. Other features include electrical power supply, security fencing, operator facilities, and equipment storage.

The treatment facility will handle both untreated and treated groundwater. Treatment chemicals and treatment byproducts will also be handled at this facility. An inventory of materials and wastes handled at the treatment facility is provided in Table 2. Based on these data, analytes for background soil sampling in the vicinity of the treatment facility will consist of metals including Cr(VI) and Cr(T), sodium, chloride, EC, and pH.

Effluent Pipeline to Injection Wells

The effluent pipeline, which was constructed at ground surface, will convey treated groundwater from the treatment facility to the injection wells. Injection wells IW-2 and IW-3 are located west of the treatment facility (Figure 1). From the treatment facility, the effluent pipeline runs along the north side of old Route 66. This pipeline is laid at ground level and partially covered with soil. The pipeline goes underground where it turns to the north toward the injection wells and departs from old Route 66.

The chemical characteristics of the treated effluent are presented in Table 1. The treated effluent will contain trace concentrations of Cr(IV) and Cr(T), low concentrations of naturally occurring metals, and moderate TDS. Based on these data, analytes for background soil sampling in the vicinity of the effluent pipeline will consist of metals including Cr(VI) and Cr(T), sodium, chloride, and EC.

Soil Sampling Locations and Depths

The following assumptions were made in selecting sampling locations and depths:

- The depth to groundwater is greater than 10 feet
- The depth to bedrock is greater than 40 feet
- Undifferentiated sandy soil exists down to approximately 10 feet
- Lateral transport of potential spills/releases may occur within Bat Cave Wash. Other likely drainage areas will also be identified and sampled during the field effort as appropriate.
- Maximum possible exposure for human receptors is conservatively assumed to be no deeper than 10 ft bgs and no deeper than 6 ft bgs for burrowing ecological receptors.

Background soil samples will be collected from each of the three components of the Interim Measure No. 3 system as well as at the extraction well and an area of potential impact (down the wash) as described below. Table 3 provides a summary of the number of samples recommended for each area.

MW20 Bench to Treatment Plant

The influent pipeline consists of approximately 3,000 linear feet of pipe buried approximately 3 feet below grade. Along the influent pipeline there are sensor stations approximately every 500 linear feet along the pipeline, and at least one air vent valve. Five locations are proposed to be sampled along the influent pipeline at approximately 500 foot intervals and including potential spill/break points (e.g., sensor stations or vent valves). Samples will be collected in the hillside area and in the wash area to represent the different landforms and associated soil types. Soil samples will be collected at 3 depths at each location including the surface (0 to 6 inches bgs), and at depths of 3 and 6 feet bgs.

Area of Potential Impact (Bat Cave Wash)

If there were a spill/release along the influent pipeline, some portion of the spill could travel laterally down Bat Cave Wash. Therefore, four locations at approximately 500 foot intervals are proposed for sampling. Soil samples will be collected at 3 depths at each location including the surface (0 to 6 inches bgs), and at depths of 3 and 6 feet bgs.

Treatment Facility

Four locations are recommended to be sampled around/within this facility. At a minimum, four samples are proposed to be collected on the perimeter of the facility, one per side. Soil samples will be collected at 3 depths at each location including the surface (0 to 6 inches bgs), and at depths of 3 and 6 feet bgs.

Effluent Pipeline to Injection Wells

The effluent pipeline consists of approximately 2,000 linear feet of pipeline located aboveground. Five sampling locations are recommended at approximately 500-foot intervals along the effluent pipeline with the last sampling location at the injection well site. Sample locations along old Route 66 will be collected from the shoulder of the road to avoid impacts to the road surface. Soil samples will be collected at 3 depths at each location along the effluent pipeline; one at the surface (0 to 6 inches bgs) and at depths of 3 and 6 feet bgs.

Soil Sampling Methods

Preliminary sampling locations are specified in Figure 2; however, the exact locations will be determined in the field based on such factors as accessibility, topography, cultural resources, and biological resources. To the extent possible, sample locations will be situated along existing roads or in other disturbed areas. If sampling locations are required in potentially sensitive areas, access will be coordinated with BLM. The horizontal location and elevation of each sample location will be documented using a handheld Global Positioning System (GPS) unit. A sketch of the sampling location will also be entered into the logbook, if necessary, with any reference points labeled including distances to the sampling location.

Soil sampling using previously decontaminated equipment will be performed as described below. Each sample container will be closed as soon as it is filled. It will be chilled and processed for shipment to an off-site laboratory.

Surface Soil Sampling

Surface soil samples will be collected from each sampling location from 0 to 6 inches bgs. Surface soil samples will be collected using a stainless-steel hand trowel or equivalent equipment and transferred directly to appropriate containers. Sample containers will be filled to the top, taking care to prevent soil from remaining in the lid threads prior to being sealed to prevent potential contaminant migration from the sample.

Subsurface Soil Sampling

Subsurface soil samples will be collected from each sampling location at 3 and 6 feet bgs using a hand auger or a small drill rig (e.g., a pickup truck or Bobcat mounted rig). Once the specified depth is reached, the auger will be removed, and accumulated soil will be set aside in a sample-dedicated disposable 1-gallon pail. A different, clean hand auger will be inserted into the hole and used to collect the sample. Other sampling devices, such as push tubes or split-spoon samplers may be used as an option. Sample containers will be filled to the top, taking care to prevent soil from remaining in the lid threads prior to being sealed to prevent potential contaminant migration from the sample.

Analytical Program

The soil samples collected during this effort will be analyzed for the parameters listed in Table 3. Table 3 also provides information regarding the analytical methods that will be used for the analyses.

Data Management

The electronic data will be used to generate validation reports, data summary tables, and other figures. This program will follow CH2M HILL standard procedures for environmental data collection. These proven procedures result in providing the data users with simple procedures to get rapid access to stored data; provide methods of data entry with known accuracy and efficiency; apply well documented validation procedures to an electronic database; manage sample data using unique sample identification numbers; establish a sample inventory of new data collected and provide methods of sample inventory reconciliation; store and provide sample-specific attributes, including location identifiers, sample type and media, and sample date; and provide reporting and delivery formats to support data analysis and reduction.

Data Validation

Data validation will be carried out when the data packages are received from the laboratory. It will be performed on an analytical batch basis using the summary results of calibration and laboratory QC, as well as those of the associated field samples. Data packages will be

reviewed for all analytes. Raw data will be reviewed when deemed necessary. Data validation procedures will include the following:

- Review of the data package for completeness
- Review of chain-of-custody records for discrepancies that might degrade data quality
- Review for compliance with holding time and QC frequency requirements
- Evaluation of all calibration and QC summary results against the project requirements
- Verification of analyte identification and calculations for at least 10 percent of the data
- Qualification of the data using appropriate qualifier flags, as necessary, to reflect data usability limitations
- Initiation of corrective actions, as necessary, based on the data review findings

Data validation will be patterned after the U.S. Environmental Protection Agency (USEPA) *Contract Laboratory National Functional Guidelines for Inorganic Data Review*, July 2002 and, *Contract Laboratory National Functional Guidelines for Organic Data Review*, October 1999, substituting the calibration and QC requirements specified in this QAPP for those specified in the Guidelines.

Report

CH2M HILL will present the results of the soil sampling in a technical memorandum summarizing the sampling event and analysis results. The technical memorandum will consist of a discussion of the sampling, laboratory analytical results, and discussion of uncertainties in the data. Field documentation, summary tables of laboratory results and laboratory analytical data sheets will be included as attachments or appendices.

Schedule for Implementation

Following approval of this work plan, the following schedule is anticipated:

Task	Time to Complete Task
Preparation for Sampling	1 week
Sampling	3 days
Laboratory Analysis	2 weeks
Report Preparation	3 weeks

Access and Permits

Portions of the areas to be sampled are owned by the United States Bureau of Land Management (BLM). Because the baseline pre-operations data set that will be generated from this work will be an integral component of Interim Measures No. 3 operations, closure and restoration, it is presumed that the activities described herein are authorized by the BLM per the Action Memorandum dated September 17, 2004. Similarly, these activities would be exempt from CEQA per the Notice of Exemption filed by DTSC on June 30, 2004.

Approval by BLM and DTSC of the soil sampling program activities would occur through review and approval of this work plan. It is anticipated that BLM and/or DTSC will require cultural resource and biological monitoring during soil sampling as a condition of approval. All access and resource clearance issues will be coordinated with BLM prior to and throughout the field work. No other permits or approvals have been identified.

References

CH2M HILL. 2004. *Summary of Proposed Project for Interim Measures No. 3*. July.

California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). 2004. Letter approving conditions in *Summary of Proposed Project for Interim Measures No. 3*. June 30.

USEPA. 1999. *Contract Laboratory National Functional Guidelines for Organic Data Review*. October.

USEPA. 2002. *Contract Laboratory National Functional Guidelines for Inorganic Data Review*. July.



FIGURE 1
INTERIM MEASURES NO. 3
IM-3 SOIL SAMPLING WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

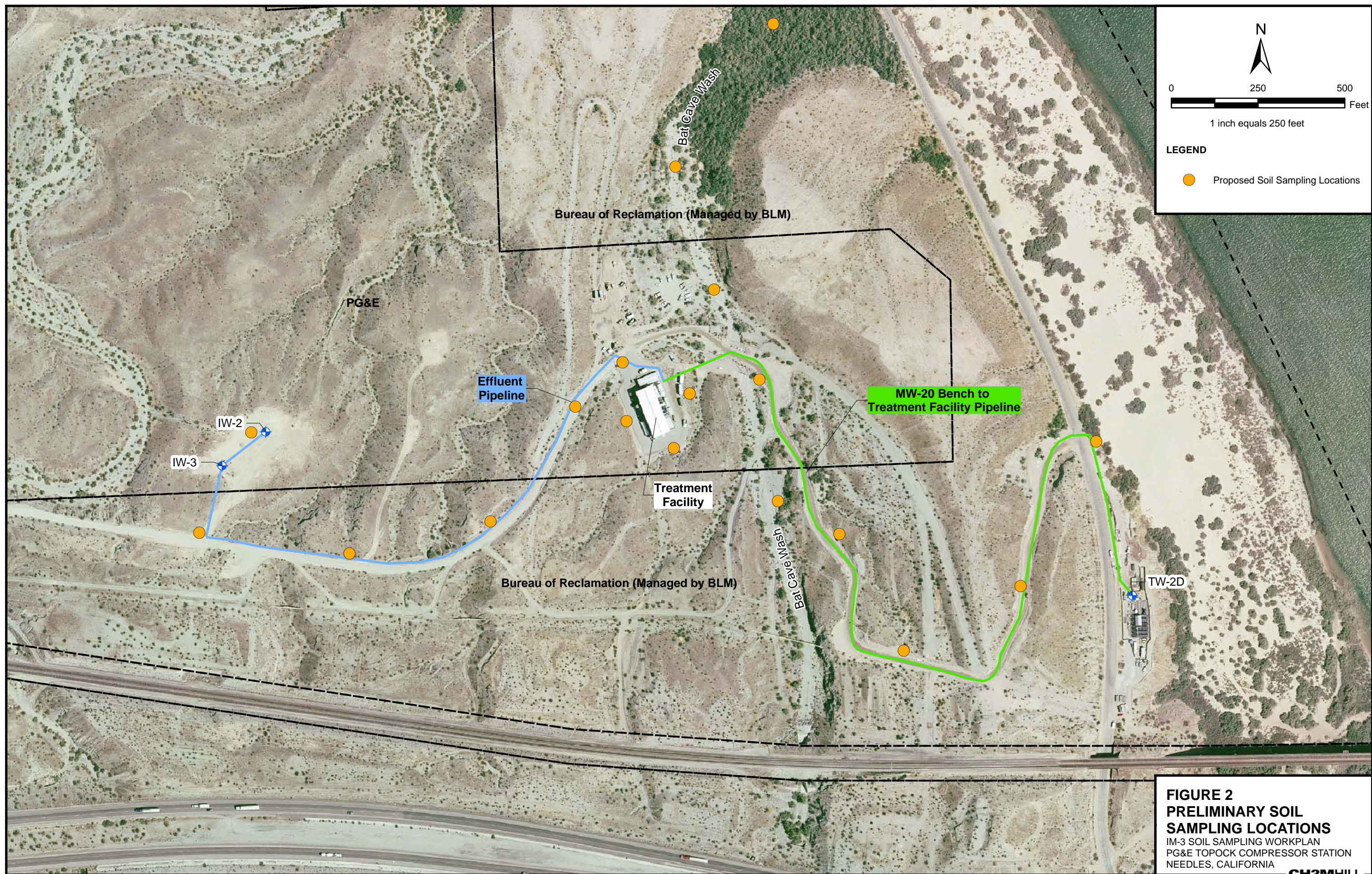


FIGURE 2
PRELIMINARY SOIL
SAMPLING LOCATIONS
IM-3 SOIL SAMPLING WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA
CH2MHILL

Table 1
Average Estimated Influent and Effluent Quality
PG&E Topock Interim Measures No. 3

Analyte	Units	Influent	RO	Effluent
		Groundwater	Concentrate	
TOC	mg/L	6.479	23	2.90
TSS	mg/L	3.9	9.6	2.665
TDS	mg/L	9,740	38,400	3,540
Ammonia-nitrogen	mg/L	2	7	0.2
pH	--	7.54	6.5	6.5
Bromide	mg/L	2.725	9.4	1.28
Chloride	mg/L	3,000	11730	1110
Fluoride	mg/L	2.53	9.52	1.02
Nitrite/nitrate	mg/L	10.07	37	4.18
Phosphorus (total)	mg/L	0.18	0.587	0.10
Sulfate	mg/L	1090	4,310	392
Sulfide	mg/L	0.4	0.4	0.4
Aluminum	mg/L	0.05	0.05	0.05
Barium	mg/L	0.3	1.125	0.12
Boron	mg/L	2.675	7.49	1.63
Iron (total)	mg/L	0.77	3	0.336
Magnesium	mg/L	175	684	64.6
Molybdenum	mg/L	0.05	0.202	0.0226
Manganese	mg/L	0.24	0.917	0.0867
Hexavalent Chromium	mg/L	7.25	0.00074	0.00293
Total Chromium	mg/L	7.92	0.0993	0.025
Lead	mg/L	0.025	0.0989	0.00899
Nickel	mg/L	0.04	0.148	0.0136
Zinc	mg/L	0.093	0.364	0.0344
Copper	mg/L	0.043	0.162	0.0173
Silicon, dissolved	mg/L	12	20.4	4.98
Silica, soluble	mg/L	21.87	37.2	9.08

Table 2

*Interim Measures No. 3 Treatment Plant Material and Waste Inventory**PG&E Topock Interim Measures No. 3*

Material/Waste	Maximum Quantity	Size of Largest Container	Units
Extracted groundwater	56,000	27,000	gallons
Sulfuric acid	2,600	55	pounds
Ferrous chloride solution	1,200	200	gallons
Sodium hydroxide solution	1,000	330	gallons
Anionic or non-ionic polymer	200	50	pounds
Anti-scalant, boiler water treatment	110	55	gallons
Gravity-settled solids from sludge holding tank	6,000	6,000	gallons
10-30% dewatered solids in phase separators	15,000	7,500	gallons
Reverse osmosis concentrate	8,000	8,000	gallons
Sodium hypochlorite solution	110	55	gallons
Citric acid cleaner	110	55	gallons
Diesel #2	150	150	gallons

Table 3

Analytical Plan Summary, Closure Planning - Baseline Soil Sampling

PG&E Topock Interim Measures No. 3

Location	Number of Locations	Number of Samples per Location	Total Number of Samples	Cr(VI)	Title 22 Metals ⁽¹⁾	Sodium ⁽²⁾	Chloride ⁽³⁾	Electrical	pH
				SW3060A/ SW7199	SW6010B/ SW7471A			Conductivity SW9050A	SW9045C
MW20 Bench to Treatment Facility Pipelines	5	3	15	15	15	15	15	15	
Treatment Facility	4	3	12	12	12	12	12	12	12
Effluent Pipeline	5	3	15	15	15	15	15	15	
Area of Potential Impact	4	3	12	12	12	12	12	12	12
Field QA/QC									
Duplicates				3	3	3	3	3	1
Rinsate Blanks				3	3	3	3	3	1
Total Number of Locations/Samples:	18		54	60	60	60	60	60	26

Notes:

- (1) Title 22 metals consist of antimony, arsenic, barium, beryllium, cadmium, chromium (total), cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc
- (2) Sample preparation will be performed using method USBR 514.8.2. The soil paste extract will be prepared in accordance with USBR 514.2.5B followed by analysis using SW846 6010B.
- (3) Sample preparation will be performed using method USBR 514.8.2. The soil paste extract will be prepared in accordance with USBR 514.2.5B followed by analysis using EPA method 300.0 or 325.3.